

CLAIMS

1. A method of providing an indication of the position of a valve member of a valve in a fluid path where the valve member is moveable between a fully open position in which a maximum flow of fluid past the valve member is permitted and a closed position in which fluid flow past the valve member is at least substantially prevented, the method including sensing the fluid pressure in the fluid path upstream of the valve member to provide a first signal to a controller, sensing fluid pressure in the fluid path downstream of the valve member to provide a second signal to the controller, and sensing fluid flow downstream of the valve member to provide a third signal to the controller, the controller comparing the first and second signals and applying the third signal, and depending on the comparison of the first and second signals and the third signal, the controller signalling an alerting device which indicates whether the valve member is in at least one of an open and the closed position.

2. A method according to claim 1 wherein the fluid pressure upstream of the valve member is sensed by a first pressure sensor and the fluid pressure downstream of the valve member is sensed by a second pressure sensor, and fluid flow downstream of valve member is sensed by a fluid flow sensor.

3. A method according to claim 1 wherein the alerting device is one of a visual display and an audible warning device.

4. A method according to claim 1 wherein the method includes configuring the controller to determine whether the fluid pressure upstream of the valve member is significantly higher than the fluid pressure downstream of the valve member, and if so, if sensed fluid flow is at least below a threshold value, to signal the alerting device to indicate that the valve member is in its closed position.

5. A method according to claim 1 wherein the valve is a butterfly valve, the valve member being rotatable in the fluid path and in its closed position, a periphery of the valve member and an internal surface of a fluid duct in which the fluid flow path is established, engaging to prevent fluid flow past the valve member.

6. A method according to claim 5 wherein the valve member is moveable between its fully open and closed positions by an actuating system under the control of a valve controller.

7. A method according to claim 6 wherein the valve controller is the same as the controller which processes the first, second and third signals, to provide the input to the alerting device.

8. A method according to claim 5 wherein the actuating system includes actuator which is connected to the valve member via a transmission.

9. A method according to claim 8 wherein the actuator is a linearly acting actuator and the valve member is of the rotatable kind, the linear action of the linear actuator being converted to a rotation of the valve member by the transmission.

10. A method according to claim 1 wherein the pressure and flow sensors are venturi or hot wire transducers which provide electrical signals to the controller.

11. A method according to claim 1 wherein the fluid flow is along a fluid flow path along which hot pressurised air bled from a gas turbine engine passes to a downstream auxiliary system.

12. A method according to claim 11 wherein the downstream auxiliary system is one of an air conditioning and anti-icing system of an aircraft, the alerting device for indicating the position of the valve member being located in or adjacent an aircraft cockpit, in each case to alert the aircraft pilot or other member of the air crew when the valve member is in at least one of an open and closed position.

13. An apparatus for providing an indication of the position of a valve member in a fluid path where the valve member is moveable between a fully open position in which a maximum flow of fluid past the valve member is permitted and a closed position in which fluid flow past the valve member is at least substantially prevented, the apparatus including a first sensor for sensing the fluid pressure in the fluid path upstream of the valve member to provide a first signal, a second sensor for sensing fluid pressure in the fluid path downstream of the valve member to provide a second signal and a third sensor for sensing fluid flow downstream of the valve member to provide a third signal, a controller for comparing the first and second signals and applying the third signal, the controller being configured so that, depending on the comparison of the first and second signals and the third signal, the controller signalling an alerting device which indicates whether the valve member is in at least one of an open and closed position.

14. An apparatus according to claim 13 wherein the pressure upstream of the valve member is sensed by a first pressure sensor and the fluid pressure downstream of the valve member is sensed by a second pressure sensor, and fluid flow downstream of valve member is sensed by a fluid flow sensor.

15. An apparatus according to claim 13 wherein the alerting device is one of a visual display and an audible warning device.

16. An apparatus according to claim 13 wherein the valve is a butterfly valve, the valve member being rotatable in the fluid path and in its closed position, a periphery of the valve member and an internal surface of a fluid duct in which the fluid flow path is established, engaging to prevent fluid flow past the valve member.

17. An apparatus according to claim 13 wherein the valve member is moveable between its fully open and closed positions by an actuating system under the control of a valve controller.

18. An apparatus according to claim 17 wherein the actuating system includes actuator which is connected to the valve member via a transmission.

19. An apparatus according to claim 18 wherein the actuator is a linearly acting actuator and the valve member is of the rotatable kind, the linear action of the linear actuator being converted to a rotation of the valve member by the transmission.

20. An apparatus according to claim 13 wherein the pressure and flow sensors are venturi or hot wire transducers which provide electrical signals to the controller.

21. An aircraft having a fluid flow path for pressurised air from an aircraft engine to a downstream auxiliary system, the aircraft including an apparatus for providing an indication of the position of a valve member in a fluid path where the valve member is moveable between a fully open position in which a maximum flow of fluid past the valve member is permitted and a closed position in which fluid flow past the valve member is at least substantially prevented, the apparatus including a first sensor for sensing the fluid pressure in the fluid path upstream of the valve member to provide a first signal, a second sensor for sensing fluid pressure in the fluid path downstream of the valve member to provide a second signal and a third sensor for sensing fluid flow downstream of the valve member to provide a third signal, a controller for comparing the first and second signals and applying the third signal, the controller being configured so that, depending on the comparison of the first and second signals and the third signal, the controller signalling an alerting device which indicates whether the valve member is in at least one of an open and closed position.